

Siemens 6ES7313-5BE01-0AB0 Manual

Brand	Siemens
Product Series	Siemens
Product Type	SFB

Description

6ES7313-5BE01-0AB0

SIMATIC S7-300, CPU 313C COMPACT CPU WITH MPI, 24 DI/16 DO, 4AI, 2AO 1 PT100, 3 FAST COUNTERS (30 KHZ), INTEGRATED 24V DC POWER SUPPLY, 32 KBYTE WORKING MEMORY, FRONT CONNECTOR (2 X 40PIN) AND MICRO MEMORY CARD REQUIRED

General information

HW functional status 01

Firmware version V2.0.0

Engineering with

- Programming package STEP 7 V5.2 SP1 or higher

Supply voltage

Rated value (DC)

- 24 V DC Yes

permissible range, lower limit (DC) 20.4 V

permissible range, upper limit (DC) 28.8 V

Load voltage L+

- Rated value (DC) 24 V
- permissible range, lower limit (DC) 20.4 V
- permissible range, upper limit (DC) 28.8 V

Input current

Current consumption (rated value) 700 mA

Current consumption (in no-load operation), typ. 150 mA

Inrush current, typ. 11 A

Power loss

Power loss, typ. 14 W

Memory

Work memory

- integrated 32 kbyte; For program and data
- expandable No

Load memory

- Plug-in (MMC) Yes
- Plug-in (MMC), max. 8 Mbyte
- Data management on MMC (after last programming), min.

10 y

Backup

- present Yes; Guaranteed by MMC (maintenance-free)
- without battery Yes; Program and data

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CPU processing times

for bit operations, typ. 0.1 μ s

for bit operations, max. 0.2 μ s

for word operations, typ. 0.2 μ s

for fixed point arithmetic, typ. 2 μ s

for floating point arithmetic, typ. 3 μ s

CPU-blocks

Number of blocks (total) 1 024; (DBs, FCs, FBs OBs, SDBs); the maximum number of loadable blocks can be reduced by the MMC being used.

DB

- Number, max. 511; Number range: 1 to 511
- Size, max. 16 kbyte

FB

- Number, max. 512; Number range: 0 to 2047
- Size, max. 16 kbyte

FC

- Number, max. 512; Number range: 0 to 2047
- Size, max. 16 kbyte

OB

- Number, max. see instruction list
- Size, max. 16 kbyte
- Number of free cycle OBs 1; OB 1
- Number of time alarm OBs 1; OB 10
- Number of delay alarm OBs 1; OB 20
- Number of cyclic interrupt OBs 1; OB 35
- Number of process alarm OBs 1; OB 40
- Number of startup OBs 1; OB 100
- Number of asynchronous error OBs 1; OB 80
- Number of synchronous error OBs 2; OB 121, 122

Nesting depth

- per priority class 8
- additional within an error OB 4

Counters, timers and their retentivity

S7 counter

- Number 256

Retentivity

- adjustable Yes
- lower limit 0
- upper limit 256

Counting range

- lower limit 0

- upper limit 999

IEC counter

- present Yes
- Type SFB

S7 times

- Number 256

Retentivity

- adjustable Yes

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— lower limit 0

— upper limit 256

— preset No retentivity

Time range

— lower limit 10 ms

— upper limit 9 990 s

IEC timer

- present Yes

- Type SFB

- Number Unlimited (limited only by RAM capacity)

Data areas and their retentivity

retentive data area in total all

Flag

- Number, max. 256 byte

- Retentivity available Yes; MB 0 to MB 255

- Retentivity preset MB 0 to MB 15

- Number of clock memories 8; 1 memory byte

Data blocks

- Retentivity adjustable No

- Retentivity preset Yes

Local data

- per priority class, max. 510 byte

Address area

I/O address area

- Inputs 1 kbyte

- Outputs 1 kbyte

Process image

- Inputs 128 byte

- Outputs 128 byte

Default addresses of the integrated channels

— Digital inputs 124.0 to 126.7

— Digital outputs 124.0 to 125.7

— Analog inputs 752 to 761

— Analog outputs 752 to 755

Digital channels

- Inputs 992

— of which central 992

- Outputs 992

— of which central 992

Analog channels

- Inputs 248

— of which central 248

- Outputs 124

— of which central 248

Hardware configuration

Number of expansion units, max. 3

Number of DP masters

- integrated none

- via CP 4

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Number of operable FMs and CPs (recommended)

- FM 8
- CP, PtP 8
- CP, LAN 6

Rack

- Racks, max. 4
- Modules per rack, max. 8; In rack 3 max. 7

Time of day

Clock

- Hardware clock (real-time) Yes
- retentive and synchronizable Yes
- Backup time 6 wk; At 40 °C ambient temperature
- Deviation per day, max. 10 s

Operating hours counter

- Number 1
- Number/Number range 0
- Range of values 0 to 2³¹ hours (when using SFC 101)
- Granularity 1 h
- retentive Yes; Must be restarted at each restart

Clock synchronization

- supported Yes
- to MPI, master Yes
- to MPI, slave Yes
- in AS, master Yes

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Digital inputs

Number of digital inputs 24

integrated channels (DI) 24

Input voltage

- Rated value (DC) 24 V
- for signal "0" -3 to +5V
- for signal "1" +15 to +30V

Input current

- for signal "1", typ. 8 mA

Input delay (for rated value of input voltage)

for standard inputs

— parameterizable Yes; 0.1 / 0.3 / 3 / 15 ms

for technological functions

— at "0" to "1", max. 16 µs

Cable length

- shielded, max. 1 000 m; 100 m for technological functions
- unshielded, max. 600 m

Digital outputs

Number of digital outputs 16

integrated channels (DO) 16

Short-circuit protection Yes; Clocked electronically

Limitation of inductive shutdown voltage to L+ (-48 V)

Output voltage

- for signal "1", min. L+ (-0.8 V)

Output current

- for signal "1" permissible range, max. 500 mA

- for signal "1" permissible range for 0 to 60 °C, max.

500 mA

- for signal "1" minimum load current 5 mA
- for signal "0" residual current, max. 0.5 mA

Switching frequency

- with resistive load, max. 100 Hz
- with inductive load, max. 0.5 Hz

Total current of the outputs (per group)

all mounting positions

— up to 40 °C, max. 8 A

— up to 60 °C, max. 4 A

Cable length

- shielded, max. 1 000 m
- unshielded, max. 600 m

Analog inputs

Number of analog inputs

- For voltage/current measurement 4
- For resistance/resistance thermometer measurement 1

integrated channels (AI) 4+1

permissible input voltage for current input (destruction limit), max.

5 V; Permanent

permissible input current for voltage input (destruction limit), max.

0.5 mA; Permanent

Technical unit for temperature measurement adjustable

Yes; Degrees Celsius / degrees Fahrenheit / Kelvin

Input ranges

- Current Yes
- Resistance thermometer Yes
- Resistance Yes

Input ranges (rated values), voltages

- 0 to +10 V Yes
- Input resistance (0 to 10 V) 100 k Ω

Input ranges (rated values), currents

- 0 to 20 mA Yes
- Input resistance (0 to 20 mA) 100 Ω
- -20 mA to +20 mA Yes
- Input resistance (-20 mA to +20 mA) 100 Ω
- 4 mA to 20 mA Yes
- Input resistance (4 mA to 20 mA) 100 Ω

Input ranges (rated values), resistance thermometer

- Pt 100 Yes
- Input resistance (Pt 100) 10 M Ω

Input ranges (rated values), resistors

- 0 to 600 ohms Yes
- Input resistance (0 to 600 ohms) 10 M Ω

Analog outputs

Number of analog outputs 2

integrated channels (AO) 2

Output ranges, voltage

- 0 to 10 V Yes
- -10 V to +10 V Yes

Output ranges, current

- 0 to 20 mA Yes
- -20 mA to +20 mA Yes
- 4 mA to 20 mA Yes

Analog value generation for the inputs

Integration and conversion time/resolution per channel

- Resolution with overrange (bit including sign),

max.

12 bit

- Integration time, parameterizable Yes; 2,5 / 16,6 / 20 ms

Analog value generation for the outputs

Integration and conversion time/resolution per channel

- Resolution with overrange (bit including sign),

max.

12 bit

- Conversion time (per channel) 1 ms

Encoder

Connectable encoders

- 2-wire sensor Yes

— permissible quiescent current (2-wire sensor), max.

1.5 mA

Errors/accuracies

Basic error limit (operational limit at 25 °C)

- Voltage, relative to input range, (+/-) 0.7 %
- Current, relative to input range, (+/-) 0.7 %
- Resistance, relative to input range, (+/-) 3 %
- Resistance thermometer, relative to input range, (+/-)

3 %

- Voltage, relative to output range, (+/-) 0.7 %
- Current, relative to output range, (+/-) 0.7 %

Interfaces

MPI

- Cable length, max. 50 m; without repeater

1. Interface

Interface type Integrated RS 485 interface

Physics RS 485

Isolated No

Power supply to interface (15 to 30 V DC), max. 200 mA

Protocols

- MPI Yes

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- PROFIBUS DP master No
- PROFIBUS DP slave No
- Point-to-point connection No

MPI

- Number of connections 8
- Transmission rate, max. 187.5 kbit/s

Services

— PG/OP communication Yes

— Routing No

— Global data communication Yes

— S7 basic communication Yes

— S7 communication Yes

— S7 communication, as client No

— S7 communication, as server Yes

Communication functions

PG/OP communication Yes

Global data communication

- supported Yes
- Number of GD loops, max. 4
- Number of GD packets, max. 4
- Number of GD packets, transmitter, max. 4
- Number of GD packets, receiver, max. 4
- Size of GD packets, max. 22 byte
- Size of GD packet (of which consistent), max. 22 byte

S7 basic communication

- supported Yes
- User data per job, max. 76 byte
- User data per job (of which consistent), max. 76 byte; 76 bytes (with X_SEND or X_RCV); 64 bytes (with X_PUT or X_GET as server)

S7 communication

- supported Yes
- as server Yes
- as client Yes; Via CP and loadable FB
- User data per job, max. 180 byte
- User data per job (of which consistent), max. 64 byte

S5 compatible communication

- supported Yes; via CP and loadable FC

Number of connections

- overall 8
- usable for PG communication 7
 - reserved for PG communication 1
 - adjustable for PG communication, min. 1
 - adjustable for PG communication, max. 7
- usable for OP communication 7
 - reserved for OP communication 1
 - adjustable for OP communication, min. 1
 - adjustable for OP communication, max. 7
- usable for S7 basic communication 4
 - reserved for S7 basic communication 4

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— adjustable for S7 basic communication,
min.

0

— adjustable for S7 basic communication,
max.

4

- usable for routing No

S7 message functions

Number of login stations for message functions, max. 8; Depending on the configured connections for PG/OP and S7 basic communication

Process diagnostic messages Yes

simultaneously active Alarm-S blocks, max. 20

Test commissioning functions

Status block Yes

Single step Yes

Number of breakpoints 2

Status/control

- Status/control variable Yes
- Variables Inputs, outputs, memory bits, DB, times, counters
- Number of variables, max. 30
- of which status variables, max. 30
- of which control variables, max. 14

Forcing

- Forcing Yes
- Forcing, variables Inputs, outputs
- Number of variables, max. 10

Integrated Functions

Number of counters 3; 3 channels (see "Technological Functions" manual)

Counting frequency (counter) max. 30 kHz

Frequency measurement Yes

Number of frequency meters 3; 3 channels up to max. 30 kHz (see "Technological Functions" manual)

controlled positioning No

integrated function blocks (closed-loop control) Yes; PID controller (see "Technological Functions" manual)

PID controller Yes

Number of pulse outputs 3; 3 channels pulse width modulation up to max. 2.5 kHz (see "Technological Functions" manual)

Limit frequency (pulse) 2.5 kHz

Potential separation

Potential separation digital inputs

- Potential separation digital inputs Yes
- between the channels, in groups of 16; and 8
- between the channels and backplane bus Yes

Potential separation digital outputs

- Potential separation digital outputs Yes
- between the channels, in groups of 8
- between the channels and backplane bus Yes

Potential separation analog inputs

- Potential separation analog inputs Yes; common for analog I/O
- between the channels and backplane bus Yes

Potential separation analog outputs

- Potential separation analog outputs Yes; common for analog I/O
- between the channels and backplane bus Yes

Configuration

Configuration software

- STEP 7 Yes; V5.1 SP2

Programming

- Command set see instruction list
- Nesting levels 8
- System functions (SFC) see instruction list
- System function blocks (SFB) see instruction list

Programming language

- LAD Yes
- FBD Yes
- STL Yes
- SCL Yes
- GRAPH Yes
- HiGraph® Yes

Know-how protection

- User program protection/password protection Yes

Dimensions

Width 120 mm

Height 125 mm

Depth 130 mm

Weights

Weight, approx. 660 g

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